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# THE IMPLEMENTATION OF RAPIDLY CONSTRUCTED HOSPITALS AND THEIR MOLECULAR ROLE IN MANAGING THE COVID-19 HEALTH CRISIS IN LIMA, 2020

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**ABSTRACT**
The study analyzed the relationship between the implementation of rapid-construction hospitals and the management of the COVID-19 health crisis in Lima during 2020, in a context characterized by high demand for health services and limited capacity of the healthcare system. A quantitative approach was employed, with a non-experimental correlational design, using surveys as the data collection technique and Spearman's correlation coefficient for statistical analysis. The results revealed significant correlations among the variables studied ($p = 0.001$), highlighting positive associations in areas such as infrastructure capacity, equipment procurement, and human resource management, as well as negative correlations in aspects related to service delivery and health strategies. However, these findings showed that the implementation of hospital infrastructure did not guarantee an effective response to the crisis, revealing a gap between the investment made and the results obtained. In conclusion, it was determined that the relationship between the variables was limited in practical terms, suggesting the need to strengthen planning, management, and institutional coordination to improve the response to future health emergencies.

**KEYWORDS**: Hospital infrastructure, COVID-19, Health management, Rapid construction, Public policies

## i. INTRODUCTION

The COVID-19 pandemic constituted an unprecedented global health crisis, generating a significant impact on health systems and revealing structural weaknesses in the response capacity of states. Several studies noted that the rapid spread of the virus strained hospital infrastructure, particularly in countries with pre-existing limitations in health investment (Capolongo and Gola, 2020; Setola and Naldi, 2022). In the case of Peru, this situation was particularly acute in 2020, forcing the implementation of emergency solutions such as the construction of temporary hospitals to expand care capacity (Berastain, 2024).

Nationally, the health crisis highlighted not only the inadequacy of hospital infrastructure but also problems related to the management, planning, and distribution of resources within the health system. Research indicated that the pandemic exposed limitations in the availability of beds nd ICU beds, medical equipment, and specialized personnel, increasing the vulnerability of the health system in the face of high demand for care (Sepúlveda et al., 2022). In this context, the implementation of rapid-deployment hospitals was proposed as a strategy to respond immediately to the emergency, seeking to mitigate the collapse of the system (Berastain, 2024).

The research problem focused on determining whether the implementation of rapid-deployment hospitals was significantly associated with the management of the COVID-19 health crisis in Lima during 2020. Despite the establishment of these facilities, there was uncertainty regarding their actual impact on improving care and reducing pressure on health services. International studies indicated that the effectiveness of these measures depended not only on the infrastructure but also on factors such as planning, logistics, and human resource management (Ndayishimiye et al., 2022; Setola and Naldi, 2022), which reinforced the need to analyze this relationship in the Peruvian context (Berastain, 2024).

Regarding the research gap, the literature revealed a limited number of empirical studies that conducted a correlational analysis of the impact of temporary hospital infrastructure on health crisis management in Latin America. While there were studies on hospital adaptation and response strategies to the pandemic, many focused on developed countries and employed qualitative or descriptive approaches (Ndayishimiye et al., 2022). Likewise, Bossard and Weiss (2021) highlighted the importance of integrating organizational and psychosocial variables into crisis management, underscoring the complexity of the phenomenon and the need for more comprehensive studies.

The research was theoretically justified by contributing to knowledge about the effectiveness of healthcare infrastructure strategies in emergency contexts, in line with the arguments put forward by Capolongo and Gola (2020), who highlighted the importance of hospital design in the resilience of health systems. From a practical perspective, it allowed for an evaluation of whether the construction of temporary hospitals constituted a viable

alternative for future health crises, considering that the pandemic drove new forms of health planning and management (Setola and Naldi, 2022). Likewise, from a methodological perspective, the study provided quantitative evidence in a field where descriptive approaches predominated, strengthening data-driven decision-making (Berastain, 2024).

The objective of the research was to determine the relationship between the implementation of a rapid-construction hospital infrastructure project and the management of the COVID-19 health crisis in Lima during 2020. Specifically, the study sought to analyze how factors such as infrastructure capacity, equipment procurement, human resource management, and healthcare processes influenced the response to the emergency. This approach addressed the need to generate scientific evidence to improve planning and response to future pandemics, in line with international recommendations on strengthening health systems (Sepúlveda et al., 2021; Ndayishimiye et al., 2022).

## II. LITERATURE REVIEW

The scientific literature developed in the context of the COVID-19 pandemic revealed that hospital infrastructure played a decisive role in the response capacity of health systems to large-scale health crises. Several studies noted that a lack of adequate space, equipment, and functional organization limited timely patient care, especially in countries with fragmented health systems. In the Peruvian context, this problem was particularly acute, as the existing infrastructure failed to meet the growing demand, forcing the implementation of emergency solutions (Berastain, 2024). In this vein, Capolongo and Gola (2020) argued that hospital design should be flexible and resilient, capable of adapting to critical situations, while Setola and Naldi (2022) emphasized that spatial organization and the quality of facilities directly influenced the efficiency of care during the pandemic.

Regarding temporary hospital models, evidence indicated that these constituted a widely used strategy globally to rapidly expand hospital capacity. Countries such as China, Italy, and Peru implemented rapidly constructed infrastructure to respond to the accelerated increase in cases. However, recent studies noted that the effectiveness of these models depended not only on the speed of their implementation but also on their integration with the health system, the availability of resources, and logistical planning (Ndayishimiye et al., 2022). In the context analyzed, the construction of temporary hospitals in Lima sought to meet the demand for care, although their actual impact needed to be evaluated from a correlational perspective (Berastain, 2024).

Regarding health crisis management, the literature emphasized that infrastructure alone did not guarantee an effective response; rather, it had to be coordinated with management processes, institutional leadership, and timely decision-making. Sepúlveda et al. (2021) noted that the capacity of health systems to address the pandemic depended on coordination among resources, public policies, and intervention strategies. Likewise, Bossard and Weiss (2021) highlighted the importance of organizational and psychosocial factors in crisis preparedness and response, demonstrating that comprehensive management was key to optimizing health outcomes. In this regard, the implementation of rapid-deployment hospitals should be analyzed not only from a physical perspective but also in terms of its integration with health management (Berastain, 2024).
On the other hand, international evidence allowed for relevant comparisons of hospital infrastructure across different countries. The analyzed document showed that countries such as Spain had a similar infrastructure ratio to Peru in terms of hospitals per capita, while Australia exhibited a greater deficit; however, these countries achieved different outcomes in pandemic management, demonstrating that infrastructure was not the sole determining factor (Berastain, 2024). In this regard, authors such as Setola and Naldi (2022) and Ndayishimiye et al. (2022) agreed that variables such as planning, governance, the organization of the health system, and the use of technologies significantly influenced the capacity to respond to the health crisis.

The literature consistently highlighted the importance of hospital planning and design as key elements for addressing future health emergencies. Several studies noted that health systems should shift toward more flexible, integrated, and sustainable models capable of adapting rapidly to high-demand scenarios (Capolongo and Gola, 2020). Likewise, the need to strengthen investment in infrastructure, human resources, and health management was emphasized as essential components for improving the system's resilience. In this context, the analysis of the implementation of rapid-construction hospitals in Peru provided relevant evidence on the effectiveness of these strategies, contributing to the development of public policies aimed at improving the management of health crises (Berastain, 2024).

## III.METHODOLOGY

The research was conducted using a quantitative approach, as it aimed to measure and analyze the relationship between variables through the use of statistical procedures, thereby yielding objective and verifiable results. This approach was appropriate for determining the degree of association between the implementation of rapid-construction hospitals and the management of the COVID-19 health crisis in Lima (Berastain, 2024).
Regarding the type and design of the research, the study was descriptive and employed a non-experimental, correlational design, as the variables were not manipulated but rather observed in their natural context to identify the relationship between them. This design allowed for an analysis of how the dimensions of hospital infrastructure

implementation were linked to the management of the health crisis, without directly intervening in the phenomena under study (Berastain, 2024).

Regarding the population and sample, the study considered as the unit of analysis the personnel involved in the implementation and operation of the rapid-construction hospital, selecting a representative sample using previously established criteria. The population consisted of actors linked to the health system in the context of the pandemic, which allowed for the collection of relevant information on the perception and functioning of the variables under study (Berastain, 2024).

Regarding data collection techniques and instruments, a survey technique was used, administered via a structured questionnaire that measured the dimensions of the independent variable (implementation of the rapid-construction hospital) and the dependent variable (health crisis). This instrument underwent validation and reliability testing, ensuring the quality of the collected information and the consistency of the results obtained (Berastain, 2024).

For data analysis, descriptive and inferential statistical procedures were employed, notably the use of Spearman's correlation coefficient, which allowed for determining the degree of relationship between the variables. Additionally, a level of statistical significance ($p \leq 0.05$) was established for hypothesis testing, which facilitated the interpretation of whether or not a significant relationship existed between the analyzed factors. The results obtained provided evidence of the behavior of the variables in the context studied (Berastain, 2024).

## IV. RESULTS

The following presents the results obtained from the statistical analysis, without interpretation, including the correlation coefficients and significance levels between the study variables.

Table 1. Correlation between the implementation of rapid-construction hospitals and the health crisis

| Variables | Spearman's Rho | Sig. (p-value) |
|---|---|---|
| **Hospital implementation vs. health crisis** | 0.827 | 0.001 |

Source: Author's own analysis based on the study results

Table 1 showed a Spearman correlation coefficient of Rho = 0.827, indicating a strong positive relationship between the implementation of rapid-construction hospitals and the health crisis. Likewise, the significance value $p = 0.001$ ($p < 0.05$) showed that this relationship was statistically significant, confirming that the variables were significantly associated in the context studied.

Table 2. Correlation by dimensions of the hospital implementation variable

| Dimensions of implementation | Spearman's Rho | Sig. (p-value) |
|---|---|---|
| Infrastructure capacity during the health crisis | 0.832 | 0.001 |
| Procurement of equipment during the health crisis | 0.766 | 0.001 |
| Provision of third-party services during the health crisis | -0.845 | 0.001 |
| Administrative assistance during the health crisis | 0.740 | 0.001 |
| Human resources recruitment during the health crisis | 0.821 | 0.001 |
| Healthcare processes and strategies during the health crisis | -0.780 | 0.001 |

Source: Prepared by the authors based on the study results.7

Table 2 showed that the dimensions of rapid-construction hospital implementation had significant correlations with the health crisis ($p = 0.001$ in all cases). High positive correlations were observed in infrastructure capacity (Rho = 0.832), equipment procurement (Rho = 0.766), administrative support (Rho = 0.740), and human resources recruitment (Rho = 0.821); while third-party service provision (Rho = -0.845) and health processes and strategies (Rho = -0.780) showed high negative correlations.

Table 3. Level of statistical significance

| Criterion | Value obtained |
|---|---|
| Significance level ($\alpha$) | 0.05 |
| p-value obtained | 0.001 |
| Statistical decision | $p < 0.05$ |

Source: Prepared by the authors based on the study results

Table 3 showed that the significance value obtained ($p = 0.001$) was lower than the established level ($\alpha = 0.05$), indicating that the results were statistically significant. Consequently, it was confirmed that there was a significant relationship between the variables analyzed in the study.

The results showed that the implementation of rapid-deployment hospitals was statistically significantly associated with the COVID-19 health crisis, with a p-value of 0.001 in all tests conducted. Likewise, high positive correlations were observed in most of the dimensions analyzed, such as infrastructure capacity, equipment

procurement, administrative support, and human resources recruitment, while some dimensions, such as the provision of third-party services and health processes and strategies, showed negative correlations. These findings reflected the existence of relevant associations between the variables studied in the analyzed context.

## V. DISCUSSION

The results obtained demonstrated the existence of statistically significant relationships between the implementation of rapid-construction hospitals and the management of the COVID-19 health crisis; however, these associations did not necessarily reflect the strategy's overall effectiveness, suggesting a gap between infrastructure investment and the outcomes achieved in the health system. This finding aligns with the observations of Setola and Naldi (2022), who noted that hospital infrastructure alone does not guarantee an efficient response if it is not coordinated with adequate planning, organization, and resource management.

Furthermore, although strong positive correlations were identified in dimensions such as infrastructure capacity, equipment procurement, and human resources, these results should be interpreted with caution, as various studies have indicated that the effectiveness of health interventions depends on the integration of multiple factors. In this regard, Ndayishimiye, Sowada, and Dyjach (2022) argued that temporary hospitals are only effective when they are properly integrated into the healthcare system, which requires adequate logistical and administrative coordination. Similarly, Sepúlveda et al. (2021) emphasized that managing health crises requires not only infrastructure but also governance, strategic planning, and institutional response capacity.

On the other hand, the negative correlations observed in dimensions such as third-party service provision and health processes and strategies revealed potential deficiencies in operational management and the implementation of health policies during the emergency. This result could be explained by a lack of coordination among institutional actors, as well as by limitations in the planning and execution of strategies, as noted by Bossard and Weiss (2021), who pointed out that organizational and psychosocial factors significantly influence the effectiveness of the response to health crises.

Regarding the study's limitations, it is acknowledged that the analysis focused on a specific context (Lima, 2020), which restricts the generalizability of the results to other scenarios. Furthermore, the correlational approach did not allow for the establishment of causal relationships, and the information was based on perceptions gathered through surveys, which could introduce biases in the data. Furthermore, external variables such as political, economic, or social factors that may also have influenced the management of the health crisis were not incorporated.

The study's findings have significant implications for public management and health planning. There is evidence of the need for investments in hospital infrastructure to be accompanied by comprehensive strategies that include planning, efficient resource management, strengthening of human capital, and institutional coordination. In this regard, the implementation of rapid-deployment hospitals can be a useful tool in emergency contexts, provided it is integrated into a systemic approach that prioritizes efficiency, sustainability, and the health system's capacity to respond to future crises.

## VI.CONCLUSIONS

The study's results led to the conclusion that there was a statistically significant relationship between the implementation of rapid-deployment hospitals and the management of the COVID-19 health crisis in Lima during 2020; however, this relationship was of very low effectiveness in practical terms, demonstrating that the implementation of infrastructure alone did not guarantee a substantial improvement in crisis management. In this regard, it was found that, although dimensions such as infrastructure, equipment, and human resources showed relevant associations, these did not translate into a comprehensive response from the health system, confirming the existence of a gap between the investment made and the results obtained.

Regarding the implications, the findings suggested the need to rethink public health policies, orienting them not only toward expanding infrastructure but also toward the comprehensive strengthening of the healthcare system. From the perspective of hospital management, it was evident that the efficiency of the crisis response depends on the coordination between infrastructure, planning, resource management, and strategic decision-making. Likewise, in the context of future pandemics, the importance of designing more comprehensive intervention models was highlighted, including not only physical solutions such as temporary hospitals but also resilient, flexible, and adaptive management systems that enable a timely and sustainable response.

The study had some limitations that should be considered. First, the sample size may have influenced the scope of the results, limiting their generalizability. Second, the analysis was conducted in a specific context—Lima in 2020—which restricts its applicability to other scenarios or time periods. Furthermore, external political, economic, or social variables that could have influenced the management of the health crisis were not incorporated, opening the possibility for future research that integrates these factors to provide a broader understanding of the phenomenon under study.

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